MITSUBISHI

Mitsubishi Safety Programmable Controller

MELSEC QS series

CC-Link Safety System Remote I/O Module

User's Manual

(Hardware)

QS0J65BTB2-12DT

Thank you for purchasing the Mitsubishi safety programmable controller MELSEC-QS series. The MELSEC-QS programmable controller is suitable for establishing safety functions for general industrial machinery.

Prior to use, please read both this manual and detailed manual thoroughly and familiarize yourself with the product.

CC-Link Safety
SAFETY FA NETWORK SERIES

MODEL	QS0J65BTB2-12DT-U-HW
MODEL CODE	13JP96
IB(NA)-0800345-I(1311)MEE	

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● SAFETY PRECAUTIONS ●

(Always read these instructions before using this equipment.)

Before using the product, please read this manual, the relevant manuals introduced in this manual, standard programmable controller manuals, and the safety standards carefully and pay full attention to safety to handle the product correctly.
In this manual, the safety instructions are ranked as " ⚠ WARNING" and " ⚠ CAUTION".

⚠ **WARNING**	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ **CAUTION**	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Note that the ⚠ CAUTION level may lead to a serious consequence according to the circumstances.
Always follow the instructions of both levels because they are important to personal safety.

Please save this manual to make it accessible when required and always forward it to the end user.

[Design Precautions]

⚠ WARNING

- When a safety programmable controller detects an error in an external power supply or a failure in programmable controller main module, it turns off all the outputs.
  Create an external circuit to securely stop the power of hazard by turning off the outputs. Incorrect configuration may result in an accident.
- Create short current protection for a safety relay, and a protection circuit such as a fuse, and breaker, outside a safety programmable controller.
- If load current more than the rating or overcurrent due to a short circuit in the load has flowed in the CC-Link Safety remote I/O module, the module defines it as a fault and turns off all the outputs.
  However, if overcurrent flows in the CC-Link Safety remote I/O module for a long time, it may cause smoke or a fire. To prevent it, create a safety circuit such as a fuse outside the module.
- When a safety remote I/O module has detected CC-Link Safety error, it turns off all the outputs.
  Note that the outputs in a sequence program are not automatically turned off. If CC-Link Safety error has been detected, create a sequence program that turns off the outputs in the program.
  If the CC-Link Safety is restored with the outputs on, it may suddenly operate and result in an accident.
- To inhibit restart without manual operation after safety functions was performed and outputs were turned OFF, create an interlock program which uses a reset button for restart.

⚠ CAUTION

- Do not bunch the wires of external devices or communication cables together with the main circuit or power lines, or install them close to each other. They should be installed 100 mm (3.94 inch) or more from each other. Not doing so could result in noise that would cause malfunctions.
- Select the external devices to be connected to the CC-Link Safety remote I/O module, considering the maximum inrush current with reference to the CC-Link Safety System Remote I/O Module User's Manual.

[Installation Precautions]

⚠CAUTION
● Use a safety programmable controller in the environment that meets the general specifications described in the QSCPU User's Manual (Hardware Design, Maintenance and Inspection). Using this programmable controller in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.
● Make sure to fix the CC-Link Safety remote I/O module with a DIN rail or mounting screws and tighten the screws with the specified torque. If the screws are too loose, it may cause a drop of the screw or module. Overtightening may cause a drop due to the damage of the screw or module.
● Do not directly touch the module's conductive parts or electronic components. Touching the conductive parts could cause an operation failure or give damage to the module.

[Wiring Precautions]

⚠ WARNING
● Completely turn off the externally supplied power used in the system when placing wiring. Not completely turning off all power could result in electric shock or damage to the product.
● When energizing or operating the module after installation or wiring, be sure to close the attached terminal cover. Not doing so may result in electric shock.

[Wiring Precautions]

⚠CAUTION

- Be sure to ground the FG terminals and LG terminals to the protective ground conductor.
  Not doing so could result in electric shock or erroneous operation.
- When wiring in the programmable controller, be sure that it is done correctly by checking the product's rated voltage and the terminal layout.
  Connecting a power supply that is different from the rating or incorrectly wiring the product could result in fire or damage.
- Tighten a terminal block mounting screw, terminal screw, and module mounting screw within the specified torque range. If the terminal block mounting screw or terminal screw is too loose, it may cause a short circuit, fire, or malfunctions. If too tight, it may damage the screw and/or the module, resulting in a drop of the screw or module, a short circuit or malfunctions. If the module mounting screw is too loose, it may cause a drop of the screw or module. Overtightening the screw may cause a drop due to the damage of the screw or module.
- Do not install the control lines or communication cables together with the main circuit lines or power cables. Failure to do so may result in malfunction due to noise.
- Be sure there are no foreign substances such as sawdust or wiring debris inside the module.
  Such debris could cause fires, damage, or erroneous operation.
- Be sure to fix the communication cables or power cables by ducts or clamps when connecting them to the module.
  Failure to do so may cause damage of the module or cables due to a wobble, unintentional shifting, or accidental pull of the cables, or malfunctions due to poor contact of the cable.
- When removing the connected communication cables or power cables, do not pull the cable with grasping the cable part.
  Remove the cable connected to the terminal block after loosening the terminal screws.
  Pulling the cable connected to a module may result in malfunctions or damage of the module or cable.

[Startup and Maintenance Precautions]

⚠ WARNING
● Do not touch the terminals while power is on. Doing so could cause shock or erroneous operation. ● Turn off all phases of the external supply power used in the system when cleaning the module or retightening the terminal block mounting screws, terminal screws, or module mounting screws. Not doing so could result in electric shock. Tighten a terminal block mounting screw, terminal screw, and module mounting screw within the specified torque range. If the terminal block mounting screw or terminal screw is too loose, it may cause a short circuit, fire, or malfunctions. If too tight, it may damage the screw and/or the module, resulting in a drop of the screw or module, a short circuit or malfunctions. If the module mounting screw is too loose, it may cause a drop of the screw or module. Overtightening the screw may cause a drop due to the damage of the screw or module.

⚠CAUTION
● Do not disassemble or modify the modules. Doing so could cause a failure, malfunctions, injury, or fire. If the product is repaired or remodeled by other than the specified FA centers or us, the warranty is not covered. ● Do not mount/remove the module to/from the base unit or terminal block more than 50 times (IEC61131-2-compliant), after the first use of the product. Failure to do so may cause module malfunctions. ● Since the module case is made of resin, do not drop or apply any strong impact to the module. Doing so may damage the module. ● Completely turn off the externally supplied power used in the system before mounting or removing the module to/from the panel. Not doing so could result in damage to the product.

[Disposal Precautions]

⚠CAUTION
● When disposing of this product, treat it as industrial waste.

● CONDITIONS OF USE FOR THE PRODUCT ●

(1) Although MELCO has obtained the certification for Product's compliance to the international safety standards IEC61508, EN954-1/ISO13849-1 from TUV Rheinland, this fact does not guarantee that Product will be free from any malfunction or failure. The user of this Product shall comply with any and all applicable safety standard, regulation or law and take appropriate safety measures for the system in which the Product is installed or used and shall take the second or third safety measures other than the Product. MELCO is not liable for damages that could have been prevented by compliance with any applicable safety standard, regulation or law.

(2) MELCO prohibits the use of Products with or in any application involving, and MELCO shall not be liable for a default, a liability for defect warranty, a quality assurance, negligence or other tort and a product liability in these applications.

(a) power plants,

(b) trains, railway systems, airplanes, airline operations, other transportation systems,

(c) hospitals, medical care, dialysis and life support facilities or equipment,

(d) amusement equipments,

(e) incineration and fuel devices,

(f) handling of nuclear or hazardous materials or chemicals,

(g) mining and drilling,

(h) and other applications where the level of risk to human life, health or property are elevated.

REVISIONS

* The manual number is given on the bottom right of the cover.

Print Date	*Manual Number	Revision
Sep., 2006	IB(NA)-0800345-A	First printing
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ABOUT MANUAL

The following manual is also related to this product.
In necessary, order it by quoting the details in the table below.

Detailed Manual

Manual name	Manual No. (Model code)
CC-Link Safety System Master Module User's Manual QS0J61BT12	SH-080600ENG (13JR88)
CC-Link Safety System Remote I/O Module User's Manual	SH-080612ENG (13JR89)

COMPLIANCE WITH THE EMC, LOW VOLTAGE, AND MACHINERY DIRECTIVES

(1) Method of ensuring compliance
To ensure that Mitsubishi programmable controllers maintain EMC, Low Voltage, and Machinery Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to the manual included with the base unit.
The CE mark on the side of the programmable controller indicates compliance with EMC, Low Voltage, and Machinery Directives.

(2) Additional measures
This product complies with the EMC, Low Voltage, and Machinery Directives. Before using this product, please read this manual, the relevant manuals, the manuals for standard programmable controllers, and the safety standards carefully and pay full attention to safety to handle the product correctly.
The descriptions are based on the requirements of the Directives and the harmonized standards. However, they do not guarantee that the entire machinery constructed according to the descriptions complies with the EMC, Low Voltage, and Machinery Directives. The manufacture of the machinery must determine the testing method for compliance and declare conformity to the EMC, Low Voltage, and Machinery Directives.

1. OVERVIEW

This manual describes the specifications and handling and wiring methods of the safety remote I/O module of the CC-Link Safety system.
After unpacking, confirm that the following are included.

Item	Quantity
QS0J65BTB2-12DT	1
Holding fixtures for screw installation	2
CC-Link Safety System Remote I/O Module User's Manual (Hardware)QS0J65BTB2-12DT	1

1.1 Safety Programmable Controller Product List

Product Name	Model	Description
CC-Link Safety system remote I/O module	QS0J65BTB2-12DT	A safety I/O module connected to external devices. The module has eight safety input points and four safety output points, and sends/receives safety data to/from the safety programmable controller over CC-Link Safety.
	QS0J65BTB2-12DT-K	An S-mark*1 certified CC-Link Safety system remote I/O module

*1: S-mark is a safety certification issued by Korea Occupational Safety and Health Agency (KOSHA).

2. SPECIFICATIONS

2.1 General Specifications

The general specifications of the QS0J65BTB2-12DT are shown below.

<table>
<tr><th>Item</th><th colspan="6">Specification</th></tr>
<tr><td>Operating ambient temperature</td><td colspan="6">0 to 55°C</td></tr>
<tr><td>Storage ambient temperature</td><td colspan="6">-40 to 75°C</td></tr>
<tr><td>Operating ambient humidity</td><td colspan="6" rowspan="2">5 to 95%RH, non-condensing</td></tr>
<tr><td>Storage ambient humidity</td></tr>
<tr><td rowspan="5">Vibration resistance</td><td rowspan="5">Conforming to JIS B 3502, IEC 61131-2</td><td></td><td>Frequency</td><td>Constant acceleration</td><td>Half amplitude</td><td>Sweep count</td></tr>
<tr><td rowspan="2">Under intermittent vibration</td><td>5 to 8.4Hz</td><td>----</td><td>3.5mm</td><td rowspan="2">10 times each in X, Y, Z directions respectively</td></tr>
<tr><td>8.4 to 150Hz</td><td>9.8m/s^2</td><td>----</td></tr>
<tr><td rowspan="2">Under continuous vibration</td><td>5 to 8.4Hz</td><td>----</td><td>1.75mm</td><td rowspan="2">----</td></tr>
<tr><td>8.4 to 150Hz</td><td>4.9m/s^2</td><td>----</td></tr>
<tr><td>Shock resistance</td><td colspan="6">Conforming to JIS B 3502, IEC 61131-2 (147 m/s^2, duration of action 11ms, three times in X, Y, Z directions respectively by sine half-wave pulse)</td></tr>
<tr><td>Operating ambiance</td><td colspan="6">No corrosive gas</td></tr>
<tr><td>Operating altitude *3</td><td colspan="6">0 to 2000m</td></tr>
<tr><td>Installation area</td><td colspan="6">Within a control panel</td></tr>
<tr><td>Overvoltage category *1</td><td colspan="6">II or lower</td></tr>
<tr><td>Pollution degree *2</td><td colspan="6">2 or lower</td></tr>
<tr><td>Equipment category</td><td colspan="6">Class III</td></tr>
</table>

*1: This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises. Category II applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.

*2: This index indicates the degree to which conductive material can be generated in terms of the environment where the equipment is used. In the environment corresponding to "Pollution level 2", basically only non-conductive pollution occurs, however temporary conductivity may occur due to occasional condensation.

*3: Do not operate or store the programmable controller in the environment where the pressure applied is equal to or greater than the atmospheric pressure at the altitude of 0m. Doing so may cause a malfunction. Please consult our branch office for more information.

2.2 Performance Specifications

The performance specifications of the QS0J65BTB2-12DT are shown below.

Item		DC-input transistor-output combined module		
		QS0J65BTB2-12DT		
Input specifications			Output specifications	
No. of input points*2		8 points (doubling input), 16 points (single input)	No. of output points	4 points (source + sink type) 2 points (source + source type)
Isolation method		Photocoupler	Isolation method	Photocoupler
Rated input voltage		24V DC	Rated load voltage	24V DC
Rated input current		Approx. 4.6mA	Operating load voltage range	19.2V to 28.8V DC (Ripple ratio: 5% or less)
Operating voltage range		19.2V to 28.8V DC (Ripple ratio: 5% or less)	Max. load current	0.5A/point
Max. simultaneous input points		100%	Max. inrush current	1.0A, 10ms or less
ON voltage/ON current		15V DC/2mA or more	Leakage current at OFF	0.5mA or less
OFF voltage/OFF current		5V DC/0.5mA or less	Max. voltage drop at ON	1.0V DC or less
Input resistance		Approx. 5.6k Ω	Protection function	Output overload protection function
Input type		Negative common (source type)	Output type	Source + sink type Source + source type
Response time	OFF → ON	0.4ms or less (at 24V DC)	Response time OFF → ON	0.4ms or less (at 24V DC)
	ON → OFF	0.4ms or less (at 24V DC)	ON → OFF	0.4ms or less (at 24V DC)
Safety remote station input response time		11.2ms*3 or less + time of noise removal filter (1ms, 5ms, 10ms, 20ms, 50ms)	Safety remote station output response time	10.4ms or less (at ON → OFF), 11.2ms or less (at OFF → ON)*4
			Surge suppressor	Zener diode
External power supply	Voltage	19.2V to 28.8V DC (Ripple ratio: 5% or less)		
	Current	60mA (24VDC, with all points ON, excluding external load current)		
	Protection function	External power supply overvoltage/overcurrent protection function		
	Fuse	8A (Not replaceable)		
Wiring method for common		16 input points/common, 4 output points/common (Terminal block 2-wire type)		
Common current		Max. 4A (Total of inputs and outputs)		
No. of stations occupied		1 station		

Item		DC-input transistor-output combined module
		QS0J65BTB2-12DT
No. of access to nonvolatile memory inside module		10^{12} times
Safety refresh response processing time		9.6ms[*5]
Module power[*1]	Voltage	19.2V to 28.8V DC (Ripple ratio: 5% or less)
	Current	140mA or less (24V DC, with all points ON)
	Protection function	Module power overvoltage/overcurrent protection function
	Fuse	0.8A (Not replaceable)
	Momentary power failure period	10ms or less
Noise immunity		Tested by a DC-type noise simulator with noise voltage of 500Vp-p, noise width of 1 μs and frequency of 25 to 60Hz.
Dielectric withstand voltage		500V AC between all external DC terminals and ground, for 1 minute
Insulation resistance		10M Ω or more between all external DC terminals and ground, by a 500VDC insulation resistance tester
Level of protection		IP2X
Weight		0.67kg
External connection system	Communication section, module power section	7-point two-piece terminal block [Transmission circuits, module power, FG] M3 x 5.2 Tightening torque: 0.425 to 0.575N•m, 2 solderless terminals or less
	External power supply section, I/O section	18-point two-piece terminal block x 3 [External power supply, I/O signals] M3 x 5.2 Tightening torque: 0.425 to 0.575N•m, 2 solderless terminals or less
Module mounting screw		M4 screw with plain washer finished round (Tightening torque: 0.824 to 1.11N•m) Mountable with a DIN rail (in 6 orientations)
Applicable DIN rail		TH35-7.5Fe, TH35-7.5Al (Compliant with IEC 60715)
Applicable cable size		0.3 to 2.0mm^2 (22 to 14 AWG)
Applicable solderless terminal		• RAV1.25-3 [Applicable wire size: 0.3 to 1.25mm^2 (22 to 16 AWG) stranded wire] • V2-MS3 (JST Mfg. Co., Ltd.), RAP2-3SL (Nippon Tanshi Co., Ltd.), TGV2-3N (Nichifu) [Applicable wire size: 1.25 to 2mm^2 (16 to 14 AWG) stranded wire]
Wire	Material	Copper
	Temperature rating	75°C or more

*1 The power supply connected to the QS0J65BTB2-12DT must satisfy the following conditions:
(1) Reinforced insulation
SELV (Safety Extra Low Voltage): Hazardous potential part (48V or more)
(2) Compliance with the LVD (Low Voltage Directive)
(3) Output voltage within 19.2V to 28.8V DC
(Ripple ratio: 5% or less.)

*2 For module technical version C or earlier, the number of input points is 8 points. (Two inputs terminals are assigned for each input since dual wiring is supported.)

*3 For technical version A, the safety remote station input response time is 32ms or less + time of noise removal filter.

*4 For technical version A, the safety remote station output response time is 32ms or less.

*5 For technical version A, the safety refresh response processing time is 38ms.

*6 For applicable solderless terminals connected to the terminal block, refer to the table above.
Use applicable wires for the solderless terminals and fix them with an appropriate tightening torque.
Use UL listed solderless terminals and, for crimping, use a tool recommended by their manufacturer.

2.3 Cable Specifications

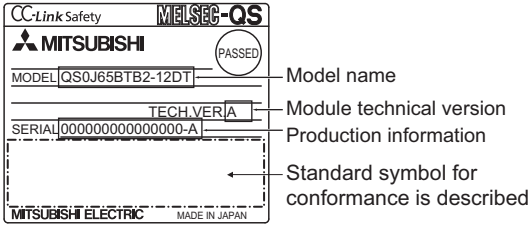
Use CC-Link dedicated cables for the CC-Link Safety system.
The performance of the CC-Link Safety system cannot be guaranteed when any other cables are used.
For the specifications or any other inquiries, visit the following website:
CC-Link Partner Association: http://www.cc-link.org/

Remark

For details, refer to the CC-Link Cable Wiring Manual issued by the CC-Link Partner Association.

2.4 Confirming Production Information

The production information of the QS0J65BTB2-12DT can be confirmed on the rating plate on the side of the module.



2.5 Safety Standards

Use the product according to the following safety standards.

Region	Safety Standards
International	IEC61508 Parts 1-7:1998-2000, ISO13849-1:2006, IEC61131-2:2007, IEC61000-6-2:2005, IEC61000-6-4:2006, IEC61784-3:2010, IEC60204-1:2006
Europe	EN954-1:1996, EN ISO13849-1:2008, EN61131-2:2007, EN61000-6-2:2005, EN61000-6-4:2007
North America	UL508, NFPA79-2007

2.6 Module/Unit Replacement

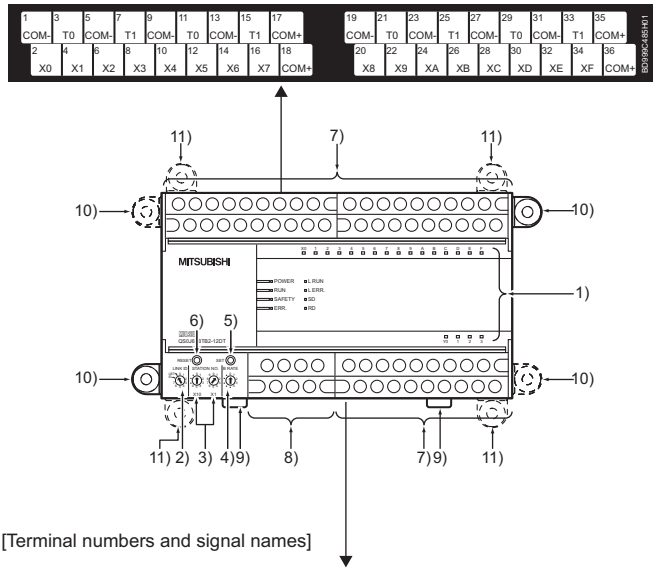
Replace the module or unit according to the following replacement cycle.

Module	Replacement Cycle
CC-Link Safety system remote I/O module	5 years

3. PART NAMES AND SETTINGS

The name of each part in the QS0J65BTB2-12DT is shown.

[Terminal numbers and signal names]



[Terminal numbers and signal names]

No.	Name		Description
1)	Indicator LEDs	LED name	Indication
		"POWER"	Indicates the power status of the safety remote I/O module. ON (green) : Normally powered OFF : Powered off or error occurred (blown fuse)
		"RUN"*1	Indicates the operating status of the safety remote I/O module. ON (green) : Normally operating, or moderate error occurred Flashing at 500ms-intervals (green) : Switch setting has been registered but not fixed yet or reading of error history data have been completed normally. Flashing at 100ms-intervals (green) : Setting has been registered normally. OFF : Major error occurred
		"SAFETY"*1	Indicates the CC-Link Safety system connection status of the safety remote I/O module. ON (green) : Connected to CC-Link Safety system*2, or self-loopback test completed normally Flash (green): Self-loopback test in execution OFF : Not connected to CC-Link Safety system, or self-loopback test completed in error
		"ERR."*1	Indicates failure or error status of the safety remote I/O module. ON (red) : Major error occurred, or self-loopback test completed in error "RUN" LED OFF: Major error occurred Flashing at 500ms-intervals (red) : Moderate error occurred or reading of error history data have been completed abnormally. Flashing at 100ms-intervals (red) : The registered switch setting differs from the actual switch setting. OFF : Normally operating
		"L RUN"	Indicates the communication status of the safety remote I/O module in the CC-Link Safety system. ON (green) : Normally communicating in the CC-Link Safety system OFF : Communication failure in the CC-Link Safety system (Timeout error)

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Description</th></tr>
<tr><td rowspan="4">1)</td><td rowspan="4">Indicator LEDs</td><td>"L ERR."</td><td>Indicates the communication error status of the safety remote I/O module in the CC-Link Safety system.
ON (red) : Value set by link ID, station No, or transmission setting switch is out of range
Flash regularly (red) : Setting of link ID, station No, and/or transmission setting switch is different from that of the internal nonvolatile memory
Flash irregularly (red) : Wrong terminating resistor setting, or noise influence
OFF : Normally operating</td></tr>
<tr><td>"SD"</td><td>Indicates the sending status of the safety remote I/O module in the CC-Link Safety system.
ON (green) : Data being sent</td></tr>
<tr><td>"RD"</td><td>Indicates the receiving status of the safety remote I/O module in the CC-Link Safety system.
ON (green) : Data being received</td></tr>
<tr><td>"X0" to "XF"
"Y0" to "Y3"</td><td>Indicates the I/O status of the safety remote I/O module.
ON (red) : I/O ON
OFF : I/O OFF</td></tr>
<tr><td>2)</td><td colspan="2">Link ID setting switch*4</td><td><table><tr><th>Setting</th><th>Description</th></tr><tr><td>0 to 7</td><td>Link ID setting</td></tr><tr><td>EL</td><td>Setting for reading error logs</td></tr><tr><td>LBT</td><td>Setting for self-loopback test</td></tr></table>To refresh the switch setting, perform the reset operation or turn the power OFF → ON of the safety remote I/O module.</td></tr>
<tr><td>3)</td><td colspan="2">Station No. setting switch*4</td><td>Set station No. of the safety remote I/O module within a range from 0 to 64.*3
• Tens place of station No. is set by ⏫ X10.
• Units place of station No. is set by ⏫ X1.</td></tr>
<tr><td>4)</td><td colspan="2">Transmission speed setting switch*4</td><td><table><tr><th>Setting</th><th>Transmission speed</th></tr><tr><td>0</td><td>156kbps</td></tr><tr><td>1</td><td>625kbps</td></tr><tr><td>2</td><td>2.5Mbps</td></tr><tr><td>3</td><td>5Mbps</td></tr><tr><td>4</td><td>10Mbps</td></tr></table>Always set this switch within a range of 0 to 4.</td></tr>
<tr><td>5)</td><td colspan="2">Setting saving switch*4</td><td>Saves the values set by switches 2) to 4) into the nonvolatile memory inside the safety remote I/O module.</td></tr>
<tr><td>6)</td><td colspan="2">Reset switch*4</td><td>Resets the hardware of the safety remote I/O module.</td></tr>
<tr><td>7)</td><td colspan="2">I/O terminal block</td><td>Two-piece terminal block for connection of external supply power and I/O signals.</td></tr>
</table>

No.	Name	Description
8)	Power supply, transmission terminal block	Two-piece terminal block for connection of module power supply and transmission signal.
9)	Hook for DIN rail	Hook used for installing the module to a DIN rail. Press the center part of the hook until a click is heard.
10) 11)	Holding fixtures for screw installation (Accessories)	Attached to a module when installing a module to a panel. (Available in two ways, 10) and 11).)

*1 Although the "RUN", "SAFETY" and "ERR." LEDs momentarily turn on immediately after power ON or reset, it does not mean any fault.

*2 The "SAFETY" LED is off when no safety remote I/O station parameters have been received during connection to the CC-Link Safety system.

*3 Duplicate station number setting is not allowed.

*4 For the switch setting methods, refer to the CC-Link Safety System Remote I/O Module User's Manual.

4. MOUNTING AND INSTALLATION

4.1 Handling Precautions

This section provides handling precautions for use of the safety remote I/O module.

(1) Do not drop the safety remote I/O module or apply any strong impact to it.

(2) Do not remove the printed circuit board (PCB) of the safety remote I/O module from the case.
Doing so may cause failure.

(3) Carefully prevent any dust or wiring chips from entering the safety remote I/O module.
Failure to do so may cause a fire, failure, or malfunction.

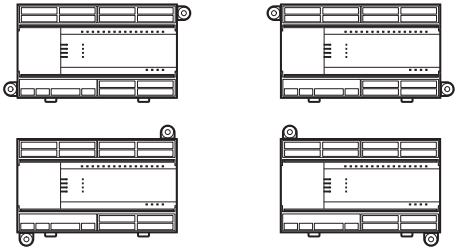
(4) When installing the safety remote I/O module to a control panel, provide clearance of at least 60mm between the module's top/bottom and any other structure or component to ensure proper airflow and to make module replacement easy.

(5) Install the safety remote I/O module to a flat surface.
If it is not flat, an excess force may be applied to the PCB, causing failure.

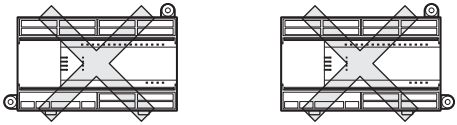
(6) Tighten the module mounting screws and terminal screws within the following torque range.
Overtightening may result in damage to the screws or the module case.

Screw	Specified torque range
Module mounting screw (M4 screw with plain washer finished round)	0.824 to 1.110N•m
Terminal screw (M3 screw)	0.425 to 0.525N•m
2-piece terminal block mounting screw (M3.5 screw)	0.680 to 0.920N•m

(7) Attach the two holding fixtures to two positions as shown below.



Note: Do not attach them in any positions other than the above.



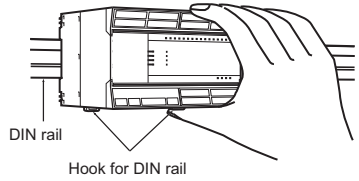
(8) To remove the safety remote I/O module mounted with module mounting screws, remove the screws first and then the holding fixtures from the module.
Attempting to remove the module from the holding fixtures with the screws still attached may damage the module and/or holding fixtures.

(9) When using a DIN rail, pay attention to the following:

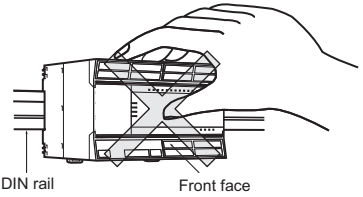
(a) Applicable DIN rail model (conforming to IEC 60715)
TH35-7.5Fe
TH35-7.5Al

(b) Installation screw intervals
Tighten the screws at pitches of 200mm (7.88 inch) or less.

(10)When installing the safety remote I/O module to the DIN rail, press the center part of the hook located on the bottom of the module until a click is heard.



Note: Do not press the front face as shown below. Doing so may cause failure.



(11)If the mechanical power supply switch is used for the safety remote I/O module, in rare cases it does not operate, when the excessive chattering is generated at power-on, and safety diagnostics function operates due to the unstable status of the input power supply voltage.
In this case, turn on power supply again.

4.2 Installation Environment

For installation environment, refer to "2.1 General Specifications".

5. WIRING

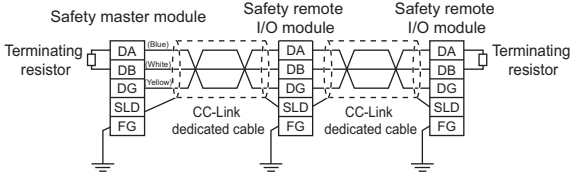
5.1 Precautions for Handling CC-Link Dedicated Cables

This section explains how to handle CC-Link dedicated cables. Do not perform any of the following, as each of them will damage CC-Link dedicated cables:

- Compressing the cable with a sharp object
- Twisting the cable excessively
- Pulling the cable too hard (exceeding the allowable tension)
- Stepping on the cable
- Placing an object on the cable
- Scratching the cable sheath

5.2 Connecting CC-Link Dedicated Cables

The following figure shows how safety remote I/O modules are connected with CC-Link dedicated cables.



POINT

1)Connect the shielded wire of the CC-Link dedicated cable to SLD terminal of each module, and ground both ends to the protective ground connectors via FG terminals.
The SLD and FG terminals are connected inside the module.
2)Always connect terminating resistors to the modules located on both ends of the data link network.
Connect a terminating resistor between DA and DB terminals.

5.3 Precautions for Wiring Module Power Supply

When wiring the module power supply of the safety remote I/O module, note the following.

- Cable length of the module power supply must be within 10m (32.81 ft.).

5.4 Precautions for Wiring Safety Devices

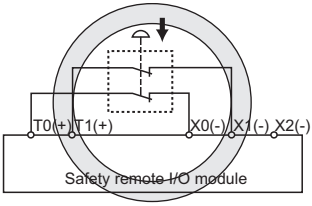
This section describes the precautions for wiring to each safety device.

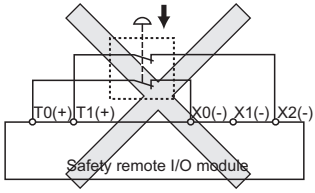
(1) Wiring of the input terminal section

(a) Combinations of input terminals

Input terminals can be used in the following combinations only. Using them in any other combination will result in a moderate error.

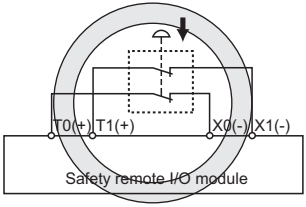
- X0 and X1
- X2 and X3
- X4 and X5
- X6 and X7
- X8 and X9
- XA and XB
- XC and XD
- XE and XF

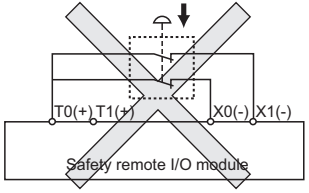




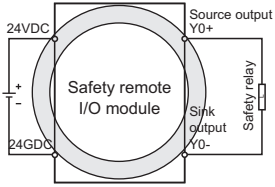
(b) Combinations of the test pulse output terminals

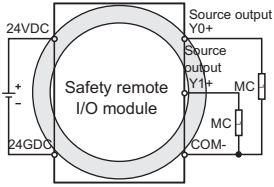
Using the same test pulse for one device is not allowed.
If the same test pulse is used in combinations such as X0 + T0 and X1 + T0, a moderate error will occur.

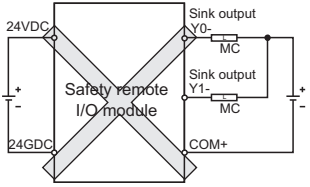




(2) Wiring of the output terminal section
Use sink outputs in combination with source outputs.
Combinations of two sink outputs or single use of sink output is not allowed.







5.5 Safety devices and wiring example

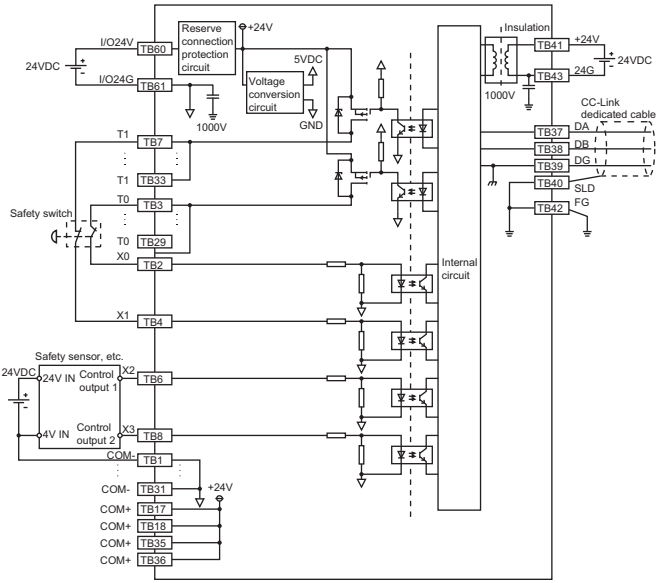
This section describes the wiring between the safety remote I/O module and safety devices.

To satisfy the wiring requirements specified in Category 4, the following two points must be executed in the safety remote I/O module.

- Double input/output wiring
- Execution of the self-diagnostic function (dark test)

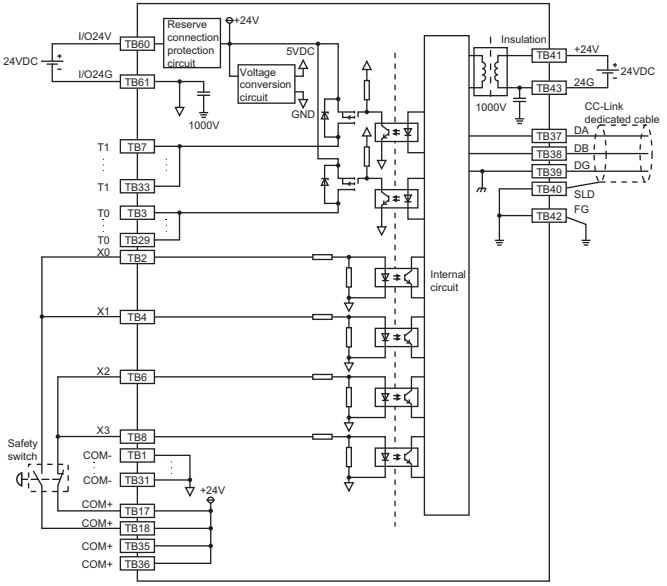
The following shows an example of wiring between the safety remote I/O module and the safety device to meet the above points.
For details on the wiring with safety devices, refer to the "Safety Application Guide".

(1) Wiring example of the QS0J65BTB2-12DT (input)



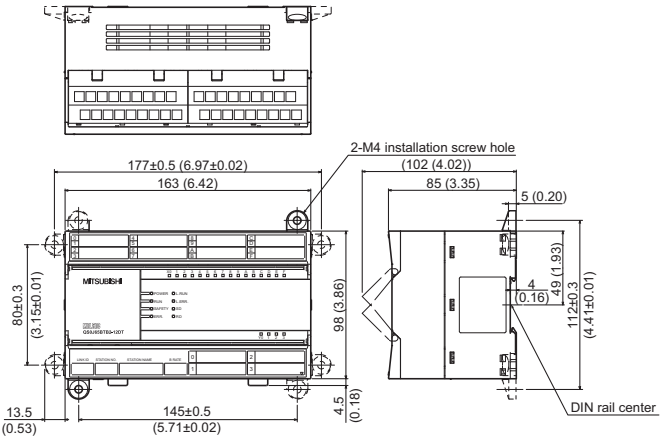
Wiring example (with a safety switch (2 NC contacts) and a safety sensor)

(2) Wiring example of the QS0J65BTB2-12DT (output)



Wiring example (source and source outputs)

6. EXTERNAL DIMENSIONS



Unit: mm (inch)

7. PRECAUTIONS FOR USE

Users must prove that their entire safety system complies with the safety standards and the Machinery Directive. The third-party certification organization will validate the safety of product for the entire safety system, including a safety programmable controller and safety components.
To establish a safety system, calculate the target failure measure (PFD/PFH) for each safety application (safety function) based on the PFD/PFH values of the safety programmable controller and connected safety components. The target failure measure (PFD/PFH) is the reliability target value for each Safety Integrity Level (SIL) defined in IEC61508 and can be calculated by the following formula.

PFD/PFH = A + B + C + D ....Calculation formula of PFD/PFH

Variable	Definition
A	Total PFD/PFH of the safety CPU module, safety power supply module, safety main base unit, and CC-Link Safety system master module
B	PFD/PFH of the CC-Link Safety system remote I/O module (1) When safety input device(s) and safety output device(s) are connected to the same CC-Link Safety system remote I/O module: B=B1 (2) When safety input device(s) and safety output device(s) are connected to different CC-Link Safety system remote I/O modules: B=B1+B2
B1	PFD/PFH of the CC-Link Safety system remote I/O module to which safety input device(s) is connected
B2	PFD/PFH of the CC-Link Safety system remote I/O module to which safety output device(s) is connected
C*1	PFD/PFH of safety input device(s)
D*1	PFD/PFH of safety output device(s)

*1 For the values, refer to the manual for the safety component used.

The following tables show the PFD/PFH values for the safety remote I/O module.

Module	PFD	PFH(/h)
PFD/PFH of the QS0J65BTB2-12DT	2.57×10^{-5}	1.15×10^{-9}
PFD/PFH of the QS0J65BTB2-12DT-K	2.70×10^{-5}	1.21×10^{-9}

8. EC DECLARATION OF CONFORMITY FOR MACHINERY DIRECTIVE

EC Declaration of Conformity

Manufacturer: Mitsubishi Electric Corporation, Nagoya Works
Address: 1-14, 5-chome, Yada-Minami, Higashi-ku, Nagoya
461-8670,Japan

Products: Type: Programmable Controller
(Open Type equipment, Installation category II)
Model: QS0-Series
(Applicable units identified in Appendix)

These products comply with the following European directives:

Directive	Name
2006/42/EC	Machinery Directive

Further details of conformity to these directives are contained in the appendices (BCN-P9999-0618-B later).

Authorised Signature:

T. Takahashi
Senior Manager, FA System Department

Date: (signature)

11/03/2011

Authorised Representative: Mitsubishi Electric Europe BV
in the European Community Gothaer Str. 8, 40880 Ratingen, Germany
through Responsible person
Signature:

H. Pütz
Executive Vice President &
Deputy Product Marketing Director,
FA European Business Group

Date: (signature)

02/03/2011

The appendices are part of this declaration. This declaration certifies the conformity with the directives mentioned, but does not contain any warranted qualities. The installation, usage and safety directions of the product documentation have to be observed.

BCN-P9999-0617-B

Appendix

QS0-Series Programmable Controllers

Range of products:

QS001CPU	5	QS061P-A1-K	5	QS0J65BTB2-12DT-K	5
QS001CPU-K	5	QS061P-A2	5	QS0J65BTS2-4T	5
QS034B	5	QS061P-A2-K	5	QS0J65BTS2-8D	5
QS034B-E	5	QS0J61BT12	5	QS0J71GF11-T2	5
QS034B-K	5	QS0J61BT12-K	5		
QS061P-A1	5	QS0J65BTB2-12DT	5		

The conformity of the above mentioned products with the regulations of the directive 2006/42/EC for machinery is shown by the application of a Technical Construction File. This is supported by selected product tests to the following standards directly and indirectly (when Generic standards are used).
Note: The mentioned products must be used as directed by the associated documentation in order to provide full compliance.

Harmonized European Standards

Reference No.	Date of Issue
EN ISO13849-1	2008

Modules marked with a mark 5 have been tested to EN ISO13849-1(2008)

This declaration is based on the conformity assessment of following Notified Body:

TÜV RHEINLAND INDUSTRIE SERVICE GMBH - TÜV Rheinland Group Am Grauen Stein D-51105 Köln Germany Phone : +49:221:8060 Fax : +49:221:806114 Email : is@de.tuv.com Website : http://www.tuv.com	NB 0035
EC Type-Examination Certificate	01/205/5097/11

Signature M. Kachi

M.Kachi
Manager, Network Development Section
FA Systems Dept.

Revision record

*	15/12/09	The list is created.
A	14 June 2010	QS0J65BTB2-4T has been corrected to QS0J65BTS2-4T due to an error in the model name.
B	30 March 2011	QS0J71GF11-T2 added to the list.

BCN-P9999-0618-B

WARRANTY

Please confirm the following product warranty details before using this product.

1. Limited Warranty and Product Support.

a. Mitsubishi Electric Company ("MELCO") warrants that for a period of eighteen (18) months after date of delivery from the point of manufacture or one year from date of Customer's purchase, whichever is less, Mitsubishi MELSEC Safety programmable logic controllers (the "Products") will be free from defects in material and workmanship.

b. At MELCO's option, for those Products MELCO determines are not as warranted, MELCO shall either repair or replace them or issue a credit or return the purchase price paid for them.

c. For this warranty to apply:

(1) Customer shall give MELCO (i) notice of a warranty claim to MELCO and the authorized dealer or distributor from whom the Products were purchased, (ii) the notice shall describe in reasonable details the warranty problem, (iii) the notice shall be provided promptly and in no event later than thirty (30) days after the Customer knows or has reason to believe that Products are not as warranted, and (iv) in any event, the notice must given within the warranty period;

(2) Customer shall cooperate with MELCO and MELCO's representatives in MELCO's investigation of the warranty claim, including preserving evidence of the claim and its causes, meaningfully responding to MELCO's questions and investigation of the problem, grant MELCO access to witnesses, personnel, documents, physical evidence and records concerning the warranty problem, and allow MELCO to examine and test the Products in question offsite or at the premises where they are installed or used; and

(3) If MELCO requests, Customer shall remove Products it claims are defective and ship them to MELCO or MELCO's authorized representative for examination and, if found defective, for repair or replacement. The costs of removal, shipment to and from MELCO's designated examination point, and reinstallation of repaired or replaced Products shall be at Customer's expense.

(4) If Customer requests and MELCO agrees to effect repairs onsite at any domestic or overseas location, the Customer will pay for the costs of sending repair personnel and shipping parts. MELCO is not responsible for any re-commissioning, maintenance, or testing on-site that involves repairs or replacing of the Products.

d. Repairs of Products located outside of Japan are accepted by MELCO's local authorized service facility centers ("FA Centers"). Terms and conditions on which each FA Center offers repair services for Products that are out of warranty or not covered by MELCO's limited warranty may vary.

e. Subject to availability of spare parts, MELCO will offer Product repair services for (7) years after each Product model or line is discontinued, at MELCO's or its FA Centers' rates and charges and standard terms in effect at the time of repair. MELCO usually produces and retains sufficient spare parts for repairs of its Products for a period of seven (7) years after production is discontinued.

f. MELCO generally announces discontinuation of Products through MELCO's Technical Bulletins. Products discontinued and repair parts for them may not be available after their production is discontinued.

2. Limits of Warranties.

a. MELCO does not warrant or guarantee the design, specify, manufacture, construction or installation of the materials, construction criteria, functionality, use, properties or other characteristics of the equipment, systems, or production lines into which the Products may be incorporated, including any safety, fail-safe and shut down systems using the Products.

b. MELCO is not responsible for determining the suitability of the Products for their intended purpose and use, including determining if the Products provide appropriate safety margins and redundancies for the applications, equipment or systems into which they are incorporated.

c. Customer acknowledges that qualified and experienced personnel are required to determine the suitability, application, design, construction and proper installation and integration of the Products. MELCO does not supply such personnel.

d. MELCO is not responsible for designing and conducting tests to determine that the Product functions appropriately and meets application standards and requirements as installed or incorporated into the end-user's equipment, production lines or systems.

e. MELCO does not warrant any Product:
   (1) repaired or altered by persons other than MELCO or its authorized engineers or FA Centers;
   (2) subjected to negligence, carelessness, accident, misuse, or damage;
   (3) improperly stored, handled, installed or maintained;
   (4) integrated or used in connection with improperly designed, incompatible or defective hardware or software;
   (5) that fails because consumable parts such as batteries, backlights, or fuses were not tested, serviced or replaced;
   (6) operated or used with equipment, production lines or systems that do not meet applicable and commensurate legal, safety and industry-accepted standards;
   (7) operated or used in abnormal applications;
   (8) installed, operated or used in contravention of instructions, precautions or warnings contained in MELCO's user, instruction and/or safety manuals, technical bulletins and guidelines for the Products;
   (9) used with obsolete technologies or technologies not fully tested and widely accepted and in use at the time of the Product's manufacture;
   (10) subjected to excessive heat or moisture, abnormal voltages, shock, excessive vibration, physical damage or other improper environment; or
   (11) damaged or malfunctioning due to Acts of God, fires, acts of vandals, criminals or terrorists, communication or power failures, or any other cause or failure that results from circumstances beyond MELCO's control.

f. All Product information and specifications contained on MELCO's website and in catalogs, manuals, or technical information materials provided by MELCO are subject to change without prior notice.

g. The Product information and statements contained on MELCO's website and in catalogs, manuals, technical bulletins or other materials provided by MELCO are provided as a guide for Customer's use. They do not constitute warranties and are not incorporated in the contract of sale for the Products.

h. These terms and conditions constitute the entire agreement between Customer and MELCO with respect to warranties, remedies and damages and supersede any other understandings, whether written or oral, between the parties. Customer expressly acknowledges that any representations or statements made by MELCO or others concerning the Products outside these terms are not part of the basis of the bargain between the parties and are not factored into the pricing of the Products.

i. THE WARRANTIES AND REMEDIES SET FORTH IN THESE TERMS ARE THE EXCLUSIVE AND ONLY WARRANTIES AND REMEDIES THAT APPLY TO THE PRODUCTS.

j. MELCO DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

3. Limits on Damages.

a. MELCO'S MAXIMUM CUMULATIVE LIABILITY BASED ON ANY CLAIMS FOR BREACH OF WARRANTY OR CONTRACT, NEGLIGENCE, STRICT TORT LIABILITY OR OTHER THEORIES OF RECOVERY REGARDING THE SALE, REPAIR, REPLACEMENT, DELIVERY, PERFORMANCE, CONDITION, SUITABILITY, COMPLIANCE, OR OTHER ASPECTS OF THE PRODUCTS OR THEIR SALE, INSTALLATION OR USE SHALL BE LIMITED TO THE PRICE PAID FOR PRODUCTS NOT AS WARRANTED.

b. Although MELCO has obtained the certification for Product's compliance to the international safety standards IEC61508 and EN954-1/ISO13849-1 from TUV Rheinland, this fact does not guarantee that Product will be free from any malfunction or failure. The user of this Product shall comply with any and all applicable safety standard, regulation or law and take appropriate safety measures for the system in which the Product is installed or used and shall take the second or third safety measures other than the Product. MELCO is not liable for damages that could have been prevented by compliance with any applicable safety standard, regulation or law.

c. MELCO prohibits the use of Products with or in any application involving power plants, trains, railway systems, airplanes, airline operations, other transportation systems, amusement equipments, hospitals, medical care, dialysis and life support facilities or equipment, incineration and fuel devices, handling of nuclear or hazardous materials or chemicals, mining and drilling, and other applications where the level of risk to human life, health or property are elevated.

d. MELCO SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL, INDIRECT OR PUNITIVE DAMAGES, FOR LOSS OF PROFITS, SALES, OR REVENUE, FOR INCREASED LABOR OR OVERHEAD COSTS, FOR DOWNTIME OR LOSS OF PRODUCTION, FOR COST OVERRUNS, OR FOR ENVIRONMENTAL OR POLLUTION DAMAGES OR CLEAN-UP COSTS, WHETHER THE LOSS IS BASED ON CLAIMS FOR BREACH OF CONTRACT OR WARRANTY, VIOLATION OF STATUTE, NEGLIGENCE OR OTHER TORT, STRICT LIABILITY OR OTHERWISE.

e. In the event that any damages which are asserted against MELCO arising out of or relating to the Products or defects in them, consist of personal injury, wrongful death and/or physical property damages as well as damages of a pecuniary nature, the disclaimers and limitations contained in these terms shall apply to all three types of damages to the fullest extent permitted by law. If, however, the personal injury, wrongful death and/or physical property damages cannot be disclaimed or limited by law or public policy to the extent provided by these terms, then in any such event the disclaimer of and limitations on pecuniary or economic consequential and incidental damages shall nevertheless be enforceable to the fullest extent allowed by law.

f. In no event shall any cause of action arising out of breach of warranty or otherwise concerning the Products be brought by Customer more than one year after the cause of action accrues.

g. Each of the limitations on remedies and damages set forth in these terms is separate and independently enforceable, notwithstanding the unenforceability or failure of essential purpose of any warranty, undertaking, damage limitation, other provision of these terms or other terms comprising the contract of sale between Customer and MELCO.

4. Delivery/Force Majeure.

a. Any delivery date for the Products acknowledged by MELCO is an estimated and not a promised date. MELCO will make all reasonable efforts to meet the delivery schedule set forth in Customer's order or the purchase contract but shall not be liable for failure to do so.

b. Products stored at the request of Customer or because Customer refuses or delays shipment shall be at the risk and expense of Customer.

c. MELCO shall not be liable for any damage to or loss of the Products or any delay in or failure to deliver, service, repair or replace the Products arising from shortage of raw materials, failure of suppliers to make timely delivery, labor difficulties of any kind, earthquake, fire, windstorm, flood, theft, criminal or terrorist acts, war, embargoes, governmental acts or rulings, loss or damage or delays in carriage, acts of God, vandals or any other circumstances reasonably beyond MELCO's control.

5. Choice of Law/Jurisdiction.

These terms and any agreement or contract between Customer and MELCO shall be governed by the laws of the State of New York without regard to conflicts of laws. To the extent any action or dispute is not arbitrated, the parties consent to the exclusive jurisdiction and venue of the federal and state courts located in the Southern District of the State of New York. Any judgment there obtained may be enforced in any court of competent jurisdiction.

6. Arbitration.

Any controversy or claim arising out of, or relating to or in connection with the Products, their sale or use or these terms, shall be settled by arbitration conducted in accordance with the Center for Public Resources (CPR) Rules for Non-Administered Arbitration of International Disputes, by a sole arbitrator chosen from the CPR's panels of distinguished neutrals. Judgment upon the award rendered by the Arbitrator shall be final and binding and may be entered by any court having jurisdiction thereof. The place of the arbitration shall be New York City, New York. The language of the arbitration shall be English. The neutral organization designated to perform the functions specified in Rule 6 and Rules 7.7(b), 7.8 and 7.9 shall be the CPR.

Country/Region	Sales office/Tel
USA	Mitsubishi Electric Automation Inc. 500 Corporate Woods Parkway, Vernon Hills, IL 60061, USA Tel : +1-847-478-2100
Brazil	MELCO-TEC Representacao Comercial e Assessoria Tecnica Ltda. Av. Paulista, 1439, cj74, Bela Vista, Sao Paulo CEP: 01311-200-SP Brazil Tel : +55-11-3146-2200
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